Industrial Finishing

An Independent Publication Devoted To The Finishing of Industrial Products

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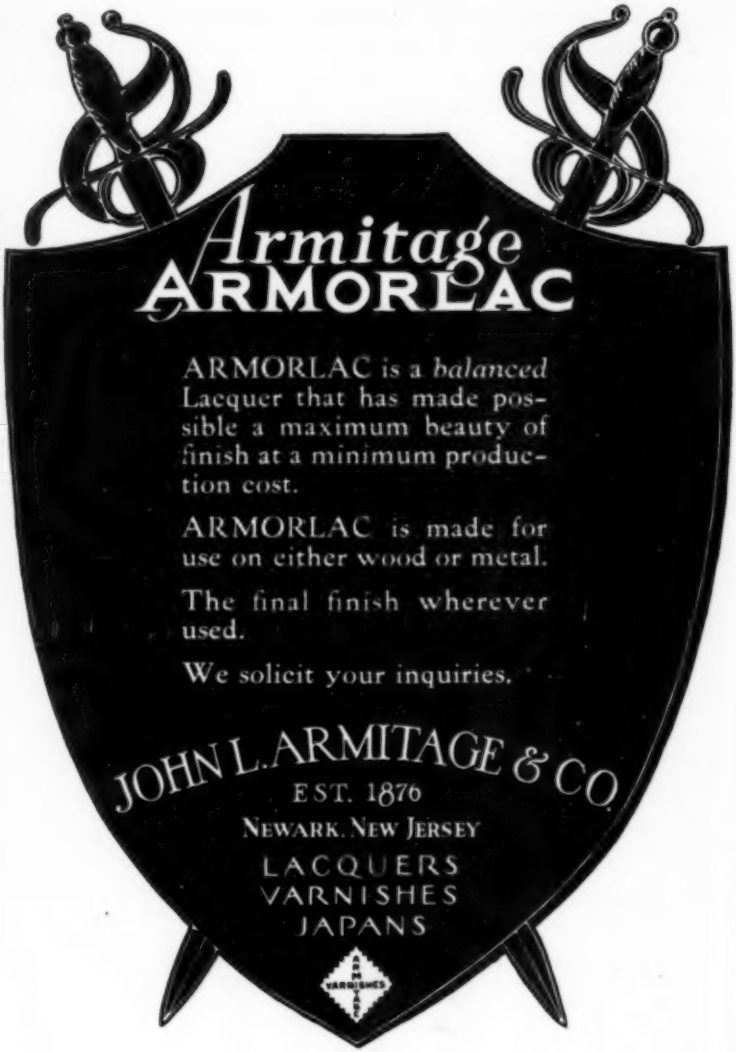
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With the Editor

A RECENT letter from Mr. Edward C. H. Rottmann, one of the many foreman finishers whose interest in industrial finishing progress has been stimulated through reading and writing for INDUSTRIAL FINISHING, includes the following significant paragraph:

"Mr. W. H. Martindale's supplement to my article in the February issue on Pyroxylin Enamel, was read here (in Kansas City) by many with interest. I feel honored that my article merited attention, and by so doing I know that the INDUSTRIAL FINISHING magazine is fulfilling its purpose in serving as a common ground where we can all meet and discuss these problems to the advantage of all concerned."

Here Mr. Rottmann points out, very clearly and forcibly, one of the outstanding features of INDUSTRIAL FINISHING, namely, reader interest. Reader interest in INDUSTRIAL FINISHING is remarkable— ask the man who reads it.

This valued feature is many times multiplied, due to the fact that instead of being dominated by a few staff writers, INDUSTRIAL FINISHING'S reading pages are open to all executives and all practical and technical men who have some comment or criticism to make, a question to ask, an idea or improvement to suggest, or some worthy news or method to report. It is a "gold mine" of information and a most convenient medium for the exchange of experiences, ideas and facts, as each individual sees or interprets them.

On this basis of reader interest, supplemented by large circulation and numerous other valuable features, INDUSTRIAL FINISHING logically serves also as the ideal medium to which industry looks for what to buy, where to buy, and why.

W. H. Rohr

Managing Editor

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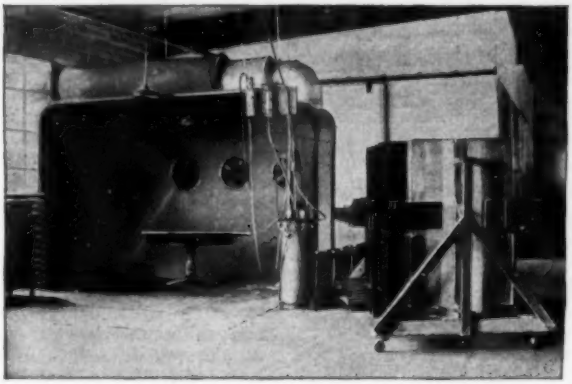


Good lighting is an important factor in modern spray booth work.

Finish Spraying and Equipment

Some of the problems of the finishing room, particularly speeding production by the use of spraying equipment for the application of lacquers and varnishes.

By Robt. L. Kent

NOTABLE developments have been made in finishing, through the tremendous improvement of spraying equipment. These improvements have brought about enormous strides in the application of varnish, lacquers, and other finishes; have speeded production in the plants where modern equipment is in use; have thus lowered the cost per unit of the item produced and in the last analysis have widened the sales field.

Passing of Old Methods

While the tendency among farsighted manufacturers is to get away from old and slow methods in the finishing room, many are still retarding their own progress by adherence to obsolete practices. It is not enough to install the latest and most efficient equipment. No matter how good the materials with which men work, results do not improve unless the tools are used intelligently. This is the crux of the whole matter.

One who comes in contact with finishing rooms not infrequently hears adverse comment on spray guns and other equipment; but talk of this character is merely idle chatter. It is based on ignorance.

That there still exists, in certain quarters, a determination to work along old lines is evident, and where this will exists the chances are that even though improved tools are supplied, no high degree of efficiency in their use will be attained unless management forces the issue.

Selection of Equipment

Obviously the first step is the selection of spraying equipment—spray gun, containers, air conditioning unit, air and material hose, motors, etc. The right type of equipment means better work. There is just as much inconvenience and unnecessary expense involved in securing equipment inadequate to the needs of the finishing room, as there is in securing equipment that would properly belong in a large plant, where the production requirements are greater.

In ordering the equipment there are many apparently small considerations which later loom large as problems. For example, it is always wise to make certain that the compressor has a capacity of air supply sufficient for the operation of the type of spray guns needed, and for dusting guns, and perhaps for an additional spray gun at the same time.

Where the work of the finishing room may require these facilities it would be foolish not to make certain of having them when needed. On the other hand, where no such need exists it is evident that this type of compressor is too large and therefore represents waste.

A word more about the selection of the compressor: Make certain that the compressor is designed especially to meet the requirements of your particular work. For example: The problems of the automobile finishing room differ from those of a small finishing room in a woodworking plant, consequently there will be a radical difference in the size of equipment needed. Then too, that which serves today may be inadequate a few months or a few years hence. All this must be considered before the selection and installation of equipment.

For Auto Finishing

Following is spraying equipment for motor car finishing: (This is equipment put out by a reputable manufacturer and does not include the motor.)

A—Two spray guns, for lacquer enamels and undercoats.

B—Two, quart-size attachable syphon feed cups.

C—One 15-ft. length of air hose, and connections.

D—One 15-ft. length of metal lined material hose and connections.

E—One material pressure container furnished with inner receptacle.

F—Two 25-ft. lengths of main line air hose and connections.

G—One combination oil and water extractor—pressure regulator, fitted with two gauges.

H—One air dusting gun.

Use Suitable Lacquers

With reference to lacquers it must be understood that there are a great many lacquers manufactured. Each lacquer has its own specific duty to perform and for this reason the lacquers should be selected with the greatest care, the object always in mind being to get the right kind of finishing material for the job.

Expense, at least insofar as securing the cheapest regardless of what use is intended to be made of it, should not be considered in selecting lacquers unless, of course, the important consideration is price. Where a quality finish is of paramount importance, price is secondary.

"For finishing automobiles with lacquer or nitro-cellulose materials, the primers, surfacers and

lacquers must be constructed to withstand the elements and abuse that an automobile finish is subject to," declared an expert on automobile finishing to the writer recently.

This statement indirectly emphasizes the need of selecting lacquers for the type and quality of the product, with a great deal of thought regarding the conditions the finish will be subjected to. It is axiomatic that finishes on outside exposure deteriorate much more rapidly than when they are kept indoors.

Wood lacquer for use in furniture finishing must have specific characteristics that make it more applicable to furniture needs. A wood lacquer, when applied with a spray gun on furniture, must have body, a certain depth to its finish and such other qualities as are necessary to permit ease in rubbing to a surface for polishing.

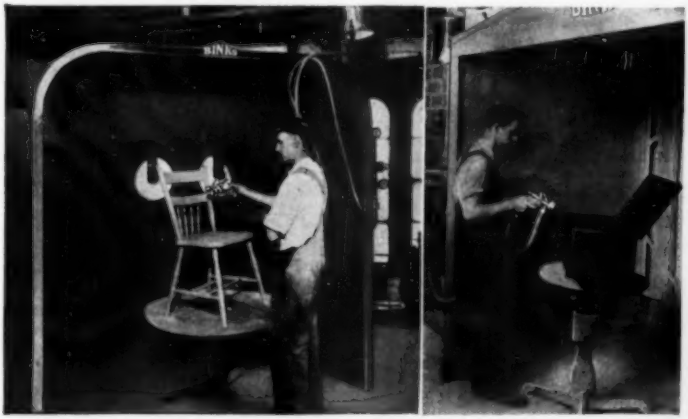
Spraying Lacquer

Regarding the use of the spray gun in the application of lacquers an expert connected with a concern that has given this subject a great deal of attention and who himself has had the opportunity of delving into it, says:

"All lacquers are best handled with a spray gun, due to the fact that the principle of drying is by evaporation, and when brushed they have a tendency to show brush marks. While there are a number of so-called 'brushing lacquers' on the market, if it is possible to spray them a much finer finish is produced.

"Due to the fact that there is a difference in the chemical analysis of varnishes and lacquers, it is not advisable to use the same spray gun for both types of material, unless the spray gun is thoroughly cleaned before the change."

Lacquer solvents are of a very volatile nature, consequently they have an affinity for oils. This has a tendency to curdle or break down the varnish solution. Varnish solvents, such as turpentine or petroleum products, when



Spraying small articles in small booths.

brought in contact with nitrocellulose products have a tendency to break the nitro-cellulose materials and precipitate the solid contents.

Exhausting Equipment Booths

Of prime importance in the selection of a spray booth installation, is the exhausting equipment. Efficiency demands that the air and spray fumes be absorbed from every angle, as well as from the center of the booth. A guard screen in front of the fan is a safety factor not to be ignored.

Efficient exhaust demands that both the fan and booth be carefully selected to provide maximum operation at least cost. Each type of product, whether it be automobiles, refrigerators, radio cabinets, etc., requires a booth the design of which is best suited for that particular type of production. The cuts in this article (supplied through courtesy of Binks Spray Equipment Co.) show spray operating scenes in factories of different kinds.

Violins and Varnish

It has been asserted that the depth of color, in what is termed the bare wood, has been brought about by the very old age of ancient violins. However, I have removed varnish from violins that were said to be 200 years old, or more, and have found the wood to be as light in color as any new wood we have today.

To my mind this proves beyond a doubt that the secret of the Italian being so beautiful, was in the application, combined of course with superior quality.

The secret then is not alone in the quality of the varnish, for I can, in a measure, produce like results with almost any good varnish; that is, insofar as appearance is concerned to the casual observer. But the texture, the limpid richness, the velvet quality that affects both the appearance and tone, cannot be produced with varnish inferior to that used by the Italians.

It has been claimed that the superior quality of the Italian violins was due to the varnish, and while good varnish cannot make a good violin, if applied to a poor instrument, yet we know it to be absolutely true that poor varnish will rob the masterpiece of those qualities of tone which otherwise would produce an instrument of the first order.

Shellac dries as hard as flint, and Venice turpentine never dries. You can see at once the different effect these conflicting elements would have on tone.—E. Byron Lord.

Hertstein to Sell Royalin Flexible Lacquer

Mr. J. C. Hertstein, Jr., who for a number of years has covered the Grand Rapids and Western Michigan territory, demonstrating and selling lacquers and lacquer products, has taken up the line of the Royalin Flexible Lacquer Co., Inc., Long Island City. Mr. Hertstein is well known to the trade in the vicinity mentioned, having been one of the first to introduce pyroxylin lacquers to the Grand Rapids furniture plants.

New Paint Company in California

The Terminal Paint Mfg. Co., Center St. and Hazelton Ave., Stockton, Calif., is a newly incorporated and established paint manufacturing and jobbing concern owned by the following four officers: Osmund Olsen, president; D. E. Burgess, vice president; H. S. Henson, secretary and treasurer; J. E. Tracey, sales manager.

The company owns its own property and occupies a new modern brick and concrete building in which is installed complete equipment.

Motor Car Color Harmony

Excerpts from "Color Harmony in the Automotive Industry," as read at the annual meeting of the S. A. E. in Detroit, January 26 to 29, by one of the E. I. du Pont de Nemours & Co. organization.

By H. Ledyard Towle

IT has been of interest to me to meet the great number of men connected with the automobile industry that I have, and to note the hesitancy in the minds of some of them about "stepping out" in the matter of color.

And that's the trouble—color, color everywhere. The primary colors—yellow, red and blue—the secondary colors—yellow and red, making orange—red and blue, violet and blue and yellow—green. The tertiary colors—orange and violet making russet—violet and green—olive and green and orange—citrine, and all of their tints and hues. Black and white—grays, warm grays, cold grays and so on and on.

How can we face this mass of color, of tint, of hue, and intelligently take from it certain elements? Place them upon our cars so as to enhance their lines, give them lustrous beauty and most of all, sales appeal?

I think I have discovered a method that is at once sound, simple and sensible. Let us divide our thoughts about color in three parts.

1. Its relation to the body lines of the car.
2. Its relation to country-wide sales appeal.
3. Its relation to the fashions and moods of the moment.

Relation of Color to Body Lines

The juxtaposition of one color to another on a car is of the utmost importance. It may be desirable to make the model appear longer, or lower or bigger all over; or very rich in appearance;

An example of modern body design and color treatment is revealed in the 1926 Stutz

to make a small-wheelbase model appear to have greater length. Suppose for the moment that a manufacturer makes a line of "Sixes" and "Eights" — the "Sixes" being somewhat smaller in wheel-base.

Here is the problem of a short-wheelbase six-cylinder car which has for its running mate a longer wheelbase "Eight." In order that the "Six" should not suffer in appearance when placed beside the "Eight" of the same name or accidentally parked along the curb close by, it is desirable visually to lengthen the "Six." This is done by applying certain of the following rules, which, to my mind, are general, when the problem is that of seeming to lengthen any model.

1. The part of the body which is actually the longest overall from front to rear should be the lightest in color. This is usually the part of the body below the lower band extending back from the radiator to the rear.

2. The lightest stripe on the car should be along the lower band moulding usually extending from the radiator to the rear.

Continuation of Moulding on Radiator

I do not see why it is not possible to design the radiator so that the lower band moulding should continue along the side of the radiator, terminating at the front, thus giving an uninterrupted sweep of line for the entire length of the car.

The two factors mentioned in No. 1 and No. 2 will tend to focus the eye of the beholder on what is actually not only the greatest length of the car, but the part of the body whose lines are least interrupted by any deviation from straightness.

3. The wheels and upper parts of the car could be of a second color more closely related to the black fenders and splash aprons which are, for the present, standard on all small-wheelbase large-production models. The striping on louvres, spokes and upper mouldings should be slightly darker in tone than the striping along the lower band moulding already mentioned.

It is clear that these simple rules will change as the detail of body design and practice changes.

Here are some rules for making a car appear closer to the ground.

Dark Wheels Make Car Seem Lower

1. Light wheels with dark fenders and splash aprons make a model seem higher off the ground. Dark wheels simply striped make it seem lower.

2. The "brougham" or coach seems lower if the top and body below the lower belt moulding is darker and the shroud and balance of the body above the lower belt moulding is lighter. The lighter color below the windows seems to shorten the distance between the roof line and the upper moulding, which is usually just below the lower part of the window frame, making this unit seem longer and lower.

In the case of the coupe, however, the conditions are reversed. The element of design containing the windows is so comparatively short in ratio to the overall length of the car from front to rear that it is inclined to look somewhat box-like unless linked closely with the top of the shroud and the rear deck. It would seem to me, then, that the upper body of a coupe should best be in one or two darker colors, extending to the lower band moulding and

that the balance of the body should be lighter.

The roadster and touring car present problems peculiar to themselves. In the case of both it seems wisest to have the lightest color on the lower part of the body below the belt moulding and the darker color above. Most roadsters and phaetons today have a belt moulding running along the side of the body and in the case of the roadster following the curve of the rear deck to its termination.

Lighter Color Above? No!

If a lighter color is used on the upper part of the body above this moulding it has a tendency to make the model look fragile in construction for the length of the body covered by the top. This fact is caused by the cast shadow of the top. This shadow tends to make a darker tone in the seating compartment, which throws into relief the narrow strip of light color between the belt moulding and the top of the doors, making that part of the car look less strong.

The more desirable way to treat open cars designed with the belt moulding is to have the darker color above the moulding where it will have opportunity to blend with the cast shadow of the top, seeming to tie the various planes and forms together and making the construction appear more substantial. To make any model look larger and heavier it is advisable to keep away from sharp contrasts of color which have a tendency to "cut the car up."

Solid black also has the effect of apparently reducing the size of a car. Two closely related tones of gray or beige or light brown will, especially when the fenders and splash apron are also in color, give the car a much larger and heavier appearance.

The car with a carefully considered and beautifully designed silhouette should be finished in a series of closely related colors or tones that will not divide the body into separate pieces like a chocolate layer cake. Look at most Persian rugs; they are full of color and yet the rug as a whole seems dark, rich, and simple in tone.

Three Tones of One Color

This, to my mind, is the ultimate in beauty and appeal. A car in three tones of one color with perhaps a contrasting color used sparingly to enrich the whole. With wheels, fenders and splash aprons each in their appropriate tonality.

H. B. Wright Joins Hildreth

Mr. H. B. Wright, who for a number of years was connected with the Glidden Varnish Co., has become associated with the Hildreth Varnish Co., Inc., of New York. Mr. Wright will hold a prominent position in their industrial department throughout the East.

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du Pont Appoints Stocker

The Paint Department of E. I. du Pont de Nemours & Co. has announced the appointment of Frank T. Stocker as Manager in charge of its Architectural Bureau.

It is felt that the addition of Mr. Stocker to the du Pont force will result in improved service to the architectural field on account of his wide experience and acquaintance, and sound knowledge of paint practice.

Quick Recovery From Fire

According to Mr. Gompf, manager, The Lindeman Wood-Finish Co., of Indianapolis, Ind., has completely recovered from the $30,000 fire (probably of incendiary origin) which occurred in their plant March 10. In fact, the stain department was back into production the following day and three days later all other production departments were in normal operation. The loss was completely covered by insurance.

Modern small tables, decorative in design and color combinations.

Decorated Furniture Problems

Decorated furniture production involves many new problems some of which are given expert service in this article.

By C. F. Worlender

A MANUFACTURER of case goods in walnut and decorative colors submits finishing schedules as indicated herewith in Nos. 1, 2 and 3.

Finish No. 1 is used on French walnut; Finish No. 2 on butt walnut, and Finish No. 3 he does not use, but would like to know whether the application of the paint color between shellac and varnish, instead of under the shellac (his present method) would make any difference. He is having trouble with his finish scratching or marring very readily, particularly over the colored decorations.

The test of the materials shows that the shellac by itself is tough on glass, but when applied on the work, the shellac scratches off very easily right down to the bare wood.

Two coats of varnish are used in finishing, and when these are applied, the whole finish mars very readily. He is using a good grade of rubbing varnish. He asks, "Would it be possible that this is a filler trouble, and that the filler is affecting the subsequent coats; is there any good way of determining this?"

Finish No. 1.
Wash coat shellac.
Filler.
Paint color (borders).
Shellac.
Varnish.

Finish No. 2.
Stain (water or oil).
Wash coat shellac.
Filler.
Paint color (borders).
Shellac.
Varnish.

Finish No. 3.
Stain (water or oil).
Wash coat shellac.
Filler.
Shellac.
Paint color (borders).
Varnish.

In the use of paint colors for border effects, as outlined above, he wants to know which is the best method, Nos. 1, 2 or 3, and which is the best color to use: colors ground in japan, colors ground in oil or colors ground in lacquer. He wants to know which of the above colors will adhere best to the undercoats and

cause the least trouble from chipping when varnish is applied over them, and in the event that lacquer is used in place of varnish for the final finish, should there be any change in the above schedules.

An expert service man, after studying this proposition, submits the following article covering it:

It is quite apparent that there is either a lack of adhesion between the filler and the succeeding coats of finishing material, or that the colored decorations and the varnish are too "short" in oil content, although to be certain of the cause of the trouble it would be necessary to actually examine one of the pieces which show this trouble and to investigate the history of all the materials and the conditions at the time of applying and drying each coat.

There is nothing fundamentally wrong with either of the three systems of finishing, as outlined, provided the materials used are of the proper type and the correct methods and conditions of application obtain at the time of applying each coat. Finish No. 3 is probably a little better than either of the other two, in that the shellac coat is under the decorations, rather than over them. This is especially true if a rather heavy coat of shellac has been used, or if the decorations are oil colors or were not given sufficient time to dry.

In no case should the coat of shellac be heavier than a 2-lb. cut, made by reducing equal parts of a 4-lb. cut of shellac with denatured alcohol. For the best finish this coat of shellac should be allowed to dry overnight before proceeding with the finish. It will not dry absolutely hard all the way through the film in less time than this, even though it may appear to be hard and dry from a casual inspection.

As to the best colors to use for decoration, this depends considerably upon the exact conditions surrounding the work. Some people use colors ground in japan but colors ground in oil are almost the universal materials used for this purpose. The type and quantity of oil contained in the colors, as well as the type and quantity of the dryer used, should be properly proportioned for this particular type of work.

Wise use of color gives this chair an attractive appearance.

Oil colors are more elastic and less brittle than japan colors and for this reason they must be given more time to dry before recoating. Ordinarily at least 48 hours should be given for safe results. Even then care must be taken not to put a more brittle material, such as a heavy coat

of shellac, over these rather elastic materials, or cracking and checking will occur later. Also, most rubbing varnishes are less elastic than most oil colors, and where rubbing varnish is used over oil colors there is always danger of cracking and checking.

For these and other reasons, many concerns that turn out decorated furniture, apply the decorations after the varnish coats have been applied, dried and rubbed, in some instances putting one more coat of varnish over the decorations after they are dry. Probably Finish No. 4 as given below would give a tougher finish.

Finish No. 4.

Water stain—dry 24 hours.
Wash coat shellac—½-lb. to gallon; dry 5 hrs.
Sand smooth.
Filler—dry 24 to 48 hours.
Shellac—2 lbs. to gallon; dry 24 hours.
Sand smooth.
Varnish—dry 24 to 48 hours.
Sand smooth.
Decorate with oil colors—dry 48 hours.
Varnish—dry 24 to 48 hours.
Rub smooth.

Even the above mentioned system of finishing will not give a tough, mar-resisting finish unless all the materials are properly constructed. Even a rubbing varnish, which on ordinary work is satisfactory, may not be sufficiently elastic when applied over oil colors.

A good way to test this is to flow some of the oil color on clean glass and some of the varnish on clean glass, and let these samples dry for at least two or three days. Then test the films with the finger nail, or was a knife blade to see if either of them is brittle and to see if the varnish is less elastic than the oil color.

In the latter case it would not be good policy, from the cracking and checking standpoint, to apply the varnish over the oil color, as this would violate one of the cardinal principles of good finishing, which is never to use a more brittle material over a more elastic one.

It is not stated whether the stain is of the water or oil variety. Water stain is to be preferred, as certain types of oil stains are quite soluble in any shellac coatings that are applied over them. Often shellac coats, which have "bled" some of the color from the stain or filler coats, lose their toughness and are quite brittle with a little age. This would bear investigation.

The filler may be at fault in that it is oily or greasy and does not allow the succeeding coats to adhere to it, or in that it contains coloring matter that is dissolved by succeeding coats, causing them to become brittle.

Pour a little of the reduced filler on a piece of clean glass and let it dry about 48 hours; then test it for hardness and other properties. If it is correctly made it should have a hard, flinty surface, not easily dented or scratched with the finger nail, yet should not show signs of brittleness. Also, no appreciable amount of color or other materials should be dissolved from the filler by application of shellac, oil color or varnish.

As to the use, under varnish, of colors ground in lacquer for decorative purposes, this is not recommended. All of the solvents may not be evaporated before succeeding coats of varnish are applied, in which case these solvents will rot the varnish film as they work their way out. Furthermore, it is not considered good practice to sandwich a coat of lacquer material between two coats of paint or varnish materials.

To get the very best finish, from the standpoint of durability and non-chipping, it is recommended that lacquer be used throughout as the coating material. Not only will good adhesion be obtained but the finish will be so tough and horny that it will not be easily marred or scratched from the outside, provided of course, that water stain, a good grade of filler, and a good grade of lacquer are used. A suggested schedule is given as follows:

Finish No. 5.

Water stain—dry 24 hours.
Wash coat shellac—½-lb. to gallon; dry 5 hours.
Sand smooth.
Filler (suitable for use under lacquer)—dry 24 to 48 hours.
Colored lacquer enamel on borders and other decorations; dry 5 hours.
Two coats of good quality clean lacquer over entire work, applied freely, first coat one day, second coat next day.
Rub with pumice stone and oil next day after last coat of lacquer was applied.

It is realized that with all of the above suggestions, the trouble may be found elsewhere, as it is very difficult to diagnose trouble of this sort through correspondence. Much better results are obtained by a first hand examination of the work and a thorough understanding of all of the conditions surrounding the work at the time of finishing and afterward. Yet the above suggestions point out some of the possible causes of this trouble and if carefully followed through they may result in eliminating the difficulty.

Turpentine Substitutes

The question is often asked, "can turpentine substitutes be used to thin undercoats and enamels? Yes, but with poor results; you had far better get the reducer that is made for this purpose.

What are turpentine substitutes? They are prepared from fractions of petroleum, and vary greatly in specific gravity, flash point and solvent power. The selection of such a substitute must be based on the requirements. It must be completely volatilized during the drying, and must have suitable solvent powers. When used as a reducer for varnish it must not cause a precipitation of gum in the varnish.

The use of a substitute having a flash point and about the same specific gravity as turpentine is therefore recommended, being less expensive than turpentine. Turpentine substitutes can be used to advantage where conditions of service make it advisable.

Some substitutes are blended with slow-drying, cheaper solvents, and are offered for less money. But to use such cheapened substitutes as filler or stain reducers, always causes trouble by slowing the drying of the filler and causing the precipitation of some of the oil dyes in the stain.—G. E. Moran.

Finish Strainer News

For manufacturing concerns that have need of a thorough and rapid means of straining paints and various finishing liquids in quantities, the Vibrating Machinery Co., 546 W. Jackson Blvd., Chicago, Ill., have brought out the "Paint Hog" illustrated herewith. The principle of the machine is to sift by vibration of the screen only, without any other mechanical force, thus preventing grit and scale, etc., from being pushed through the meshes.

The motor, running in ball bearings, is placed directly under the riddle where the power is required. It is inclosed absolutely

water-tight, and there are no gears or transmission to get out of order. The motor armature is held stationary, the eccentrically weighted motor housing revolving around the shaft and imparting to the machine a tremendous vibration, so that all work is done at high speed. At the same time the machine appears to be motionless when seen from a short distance, as the vibration is taken up entirely at the suspension hook of the strainer.

The machine operates while suspended in mid air.

The "Paint Hog" is arranged for connection to an ordinary incandescent lamp socket and requires only one ampere of current to drive the ⅛-h. p. motor. The liquid enters through a funnel on the outer rim of the cover and is discharged, after screening, through a brass tube to which a rubber or canvas hose may be clamped.

The screen is held between two metal rings, and a supporting screen is put underneath to prolong its life. These rings are machined to fit exactly into the recess of the spun copper bottom; they are held in place by four bolts.

The screens are 20-in. in diameter and are provided with two metal handles to lift them out of the machine for the purpose of cleaning or changing screens. The machine may also be cleaned by simply plugging up the outlet and filling the bowl with suitable solvent, then letting it vibrate. The complete machine weighs 75 pounds.

The usual production per hour is 150 to 250 gallons of enamel through a 60 to 80 mesh screen, or 200 to 300 gallons of shellac through a 120 to 150 mesh screen.

Ohio Branch for Zapon

The Zapon Co. announces the opening of a branch office and warehouse at 8810 Bessemer Ave., Cleveland.

In the past, users of Zapon products in the Cleveland section have been served either from the factory in Stamford, Conn., or from the warehouse in Chicago. Consequently, this arrangement will materially speed up the time of deliveries on Zapon shipments in territory contiguous to Cleveland.

To Reproduce Wood Grain

The Wood Grain Reproduction Co. is now being formed for the purpose of providing for the general Eastern trade faithful reproductions of wood grain and marble finishes, as accomplished with equipment manufactured by the Vance Mfg. Co., of Dayton, Ohio.

Adequate space has been leased in the central portion of Long Island City, 141 East Ave., and operations are scheduled to begin shortly after April 1. John Holt is to be President and General Manager of this new enterprise. The Wood Grain Reproduction Co. of Chicago has been operating under this same plan for more than a year with considerable success.

The organization of these licensed finishing shops provides the general trade a means to secure this finish for their products where the ownership of the equipment is not practical. The process is fully patented in the U. S. and foreign countries, and the Vance Mfg. Co. is operating under an exclusive license to produce this graining process.

Auto Primers — Oil or Lacquer

Presenting one side of the question as to the relative merits of oil-base primers and lacquer primers for use under lacquer refinish jobs, in motor car refinishing.

By W. H. Martindale

IN THE refinishing of automobiles there is some question at this time as to whether, on a lacquer finish job, the refinisher should use an oil base primer or a lacquer primer. Perhaps this is a delicate subject to bring up, but since so many refinishers are face to face with the issue and in doubt, as evidenced by their inquiries in the "Questions and Answers" department of this journal, I fail to see good reason for suppressing discussion on the matter. Therefore, I feel prompted to offer some of my observations and experience along this line. Possibly others will disagree with what I say. If so, I for one, hope to see their experiences and observations published in INDUSTRIAL FINISHING.

My experience has been that, as a rule, oil base primers of the proper construction (so as to withstand lacquer solvents) are much more advisable than lacquer base primers for use under lacquer enamels, although there are some lacquer companies that strictly recommend the use of lacquer base primers.

Lacquer base primers speed up the work. In fact, I have known of cases where such a primer was allowed to dry only five or ten minutes before the lacquer surfacing materials were applied. But if the metal is not absolutely chemically clean and free from all traces of grease, wax, oil, caustic, water or similar materials, the lacquer primer sometimes does not dry properly, and very frequently will not stick. While such materials are not particularly advantageous under paint primers, nevertheless oil base primers will absorb a small quantity of such foreign materials on the surface of the metal without producing any serious defects, whereas a lacquer primer would be rendered useless.

The biggest objection to lacquer primers, even when the metal is thoroughly clean, is that they adhere to the metal surface principally by cohesion instead of by adhesion. Now after the body is finished and the finish becomes scratched or damaged so that, during a heavy storm or during washing operations on the car, water has a chance to get next to the metal, this cohesion is partially destroyed and the lacquer primer scales off the finish in an ever-growing damaged spot.

Slamming doors and other sudden shocks are also likely to chip and flake off a lacquer finish built on a lacquer base primer. Perhaps a little instance which came to my attention a few days ago will illustrate what I mean.

From Experience

A body was being finished with lacquer primer, lacquer surfacer and lacquer enamels complete, without any paint products being used at all. The old finish had been removed with a remover that contained no caustic, wax or

other injurious ingredients to remain on the surface of the metal. After the finish had been removed the car was washed twice with a thoroughly saturated rag and benzole, and before the lacquer primer was sprayed on, the body was again carefully washed with lacquer reducer.

The lacquer primer and the lacquer surfacing materials looked wonderful after they had been on a few hours. They were sanded out almost perfect with water and waterproof sandpaper. Just before applying the lacquer enamel, however, a jet of compressed air was used to dry out any traces of moisture in the cracks, seams and crevices.

Much to the surprise of the finisher, this compressed air stripped off the primer and surfacing materials for a distance back of about one or two inches around practically every one of the seams and crevices. Then, when he got to looking at the finish closer and examined it with a knife, he found that the primer failed to stick to other sections of the body just as much as around the seams. The only difference was that on the main portion of the body the air did not have a chance to get under the edge of the lacquer, as was the case where the seam was present.

The result was, the entire primer and surfacer had to be removed and the body finished up with an oil base primer and lacquer surfacer. This time the finish was entirely satisfactory.

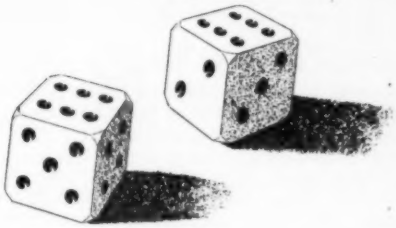
Comparative Tests

It might be argued that the reason this primer did not stick was because it was not of the proper construction. Comparative tests showed it to be as good as any on the market when used on sheet steel panels that had been carefully cleaned. It was also revealed by sheet steel test panels, which had been carefully cleaned, that all of these lacquer primers did not have the same sticking qualities as properly constructed oil base primers.

Whether the refinish shop uses lacquer base primers or oil base primers, depends a great deal upon the individual running the shop. Good appearing results can be obtained with lacquer base materials, but my experience has shown time and time again that so far as durability is concerned, the properly constructed oil base materials will give a more lasting finish than lacquer base materials—when used on objects exposed to the weather, such as automobile bodies.

Editor's Note: Available evidence shows that a number of users of finishes disagree with certain conclusions of the author of the above article, regarding primers for use under automobile lacquers, some of them being writers in INDUSTRIAL FINISHING. One of these lacquer users, in reply to a question by B. A. P. in February issue, submits the following:

Lacquer can be used as a primer just as good as an oil-base primer. An oil-base primer must get very dry and hard before it can be successfully coated. These days everything must be done that will increase production along with keeping the article up to standard. Lacquer primer of the right kind will not peel off. By using the first coat of lacquer not too heavy, or a thin coat of clear as a first coater, the automobile finisher will get a job that will not chip or peel under any



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condition. I am speaking from actual experience, having used this method for years with no bad results due to any fault of the material.—J. K. Cooper.

Flecked Finish in Colors

As was recently pointed out by INDUSTRIAL FINISHING, in an interesting article on staining and finishing wickerware and willow furniture, these goods are finished in many different colors to suit almost every individual taste.

At a recent furniture exhibition one manufacturer had a display of willow furniture which attracted considerable attention because of the unusual finish on the table tops. The way these tops had been finished is as follows:

A ground work of a solid color was first put on and made smooth then another color was applied with a spray; but instead of

For summer homes and winter sun rooms.

holding the gun close to the wood, so as to completely cover the surface, it was held at an elevation so the spray would first rise then fall on the surface like a mist or very fine rain. Only enough of this was applied to show in little specks. Two or more harmonizing colors may be applied in the same way if desired.

On some of the pieces this spraying had been done immediately after the last coat of ground was on without waiting for it to dry. If there is more than one spray in operation, and more than one spray of color is desired, each gun may have its own color, the first being followed immediately by the second.

Some of the tops shown at the exhibition were mottled with bright colors; some were flecked with silver, some with gold, and some with both. There is really no limit to the combinations which may be employed, so that every imaginable fancy can be pleased.

The thing to guard against is the danger of allowing too much of the spray to fall on the work. It is important to use only enough to fleck the surface uniformly. After this is thoroughly dry the whole is bodied up with either varnish or lacquer in the usual way.—W. P. Tindale.

Buchanan Joins Vance

T. S. Buchanan, formerly with Devoe & Reynolds Co., Inc., is now associated with The Vance Mfg. Co., of Dayton, Ohio, manufacturers of wood grain reproduction equipment, as their Eastern Sales Manager with headquarters at 52 Vanderbilt Ave., New York City.

du Pont Takes Clark

Announcement has been made by the Paint Department of E. I. du Pont de Nemours & Co. that G. W. Clark, formerly of the Goheen Corporation, Paint Engineers, has been appointed Manager in charge of Maintenance and Up-Keep Sales with headquarters at the Philadelphia office of the Company.

Patent Issued To Day

A patent was issued on March 16, 1926, to Herbert W. Day, assignor to the Painting and Finishing Equipment Sales Co., for apparatus for applying coating. It is No. 1,576,725. This patent was issued after being awarded priority in extended proceedings in the Patent Office, and covers several features of paint guns.

The W. N. Matthews Corporation of St. Louis is the exclusive licensee under this patent.

"An old cabinet maker in Grand Rapids once said that you have to have a good disposition to work in wood. It seems to me that that applies especially to a varnish maker. Varnish is essentially a product of truth and sincerity. It must be transparent as glass but durable as iron. Its whole purpose is to efface itself and let the beauty underneath show through. The Murphy Varnish Company would like to feel that its advertising is like its varnish; that it permits the sincerity of its determination to make good varnish show through."

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Realizing that these new quick drying, lacquer type finishes are bound to play an increasingly important part in finishing methods, our Research Laboratory has been working on this type of material for more than four years. We are now manufacturing a line of these quick drying finishes so complete that they may be employed throughout a finishing schedule to secure almost any present type of finish.

Every manufacturer who has adopted them has found that by their use he can secure better results in less time at lower costs. Inventories are kept down, the need for storage space reduced, and the articles manufactured have a greater value and a more highly salable quality. These Murphy materials comprise Murphy Kauriol Wood Preparation, a combined filler, stain and waterproofing material in sixteen standard colors — Murphy Period Finish — Murphy Brushing Lacquer, colored or clear — Murphy Clear Spraying Lacquer and Murphy Brushing Lacquer White Undercoating.

Finishing jobs are so varied that no one advertisement can attempt to cover them all. If you will write us what you want to do we shall be glad to recommend a schedule to fit your particular need. Or better yet, write us to send one of our practical demonstrators to call on you and work out a method to save you time, storage space and labor costs in your plant.

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A Complete Mahogany Finish

Finisher foreman, long experienced in furniture and office desk work, explains in detail the process and requirements of a quality finish on mahogany, in both varnish and lacquer.

By John H. Steffen

SINCE it is a fact recognized by practically every manufacturer and finisher foreman that a first-class finish on mahogany is very difficult to obtain, then naturally it is particularly important that the material to be used, from the selecting of the veneer on through to the final process, should be given the utmost care.

Face veneer should be of straight grain or stripe figure. The cross grain figure commonly called "fiddleback," is to be avoided, as regardless of all the best work given it in the various departments, when finished it presents a wavy, uneven finish.

Glue in the pores of veneer forms a false foundation and prevents the mahogany surface from filling properly.

Glue that softens, due to the use of water stain, is a poor grade of glue and should not be used.

Clear Water Wash

To make a mahogany veneered surface thoroughly smooth, sponge the work with clear water before giving the final sanding. This application of water not only raises the fuzz so that is can be easily cut off during the last sanding, but it also raises any bruises that may have been made in this very soft and sensitive wood. Some firms use a glue size or dexterine mixture with which to sponge the wood, but in my opinion the clear water wash gives best results.

Before leaving the cabinet room the article to be finished should be in the very best of condition, the exposed surfaces being as smooth as it is possible to get them. A few minutes spent in the cabinet room will save many minutes in the finishing room. Time and money spent in surfacing the wood, is money saved in the end.

Blow Off All Dust

Before staining, see that the surfaces are thoroughly dusted. Fine dust and particles of sand from the paper, if left in the pores, will eventually cause serious trouble. It is important in staining to see that a uniform quantity of stain is used on all parts of stained work. For all high-grade mahogany work, I find water stain is preferable as it is more durable than most oil or spirit stains.

In the mixing of stains practically every firm and finisher foreman has an individual shade or formula. There is a great variation of shades in any of the supposed standard colors, as a purchaser will readily see when buying articles from different firms.

Stain; Wash Coat; Sand

When the work is stained it should be allowed to dry over night, so that any moisture, left from the staining process, will have ample time to dry. Then the surfaces are given a thin wash coat of shellac (one part 4-lb. cut shellac to seven parts alco-

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hol), and this is applied plentifully to the work.

After the wash coat is thoroughly dry, sand to a smooth surface. This is a very important operation, and it will help materially in giving a smooth, even job. Follow this sanding with a thorough dusting. Quite often pin holes are caused by a lack of thorough dusting after this sanding, owing to the fact that the pores are partly, if not completely filled with dust of various kinds, so that the filler cannot enter the pores and perform the work it is intended to do.

Filling Is Important

The filling of mahogany is one of the most important of all the necessary operations. Use the filler heavy enough to fill properly and brush it well into the pores, being careful not to brush too long, thereby lifting out too much filler.

It is not a waste to wipe off surplus filler. On the contrary, when filler is used too thin it will not do the work required, consequently time in filling and the filler both are lost, also more varnish or lacquer will have to be used to make a fairly suitable finish.

Allow the work to dry to a flat surface; then rub the filler across the grain with sea moss or a tow-pad, cleaning up with a rag with the grain. This method, properly used, will not lift the filler out of the pores, but will leave the work well filled.

Filler Must Be Dry

The filled surface should be allowed to stand until dry beyond a doubt before going ahead with the following coats. Proper drying is necessary, for there is more to it than the mere hardening of the filler. There is also a process of oxidization. If the filler is coated over too soon, this oxidization cannot proceed in the proper manner. The coating will interfere with the absorption of oxygen and the filler will shrink instead of expanding and joining together. This shrinkage prevents the formation of a solid surface and when the following coats are put on there will be trouble.

With the use of a lacquer finish the need of the filler being bone dry is absolutely necessary to obtain the desired finish and results. All lacquer manufacturers stress this point. Some firms are using the double filling method, but if the work is properly filled the first time, the second filling is unnecessary.

Double Filling Not Good

To prove the above statement a fact, a lacquer demonstrator was forced to use four coats of lacquer, at a factory using the double filling method, to obtain the desired finish on mahogany. At a plant using the single-fill method, thoroughly filled and dried, he was able to obtain the desired finish with three coats of lacquer on their mahogany.

The firm using the double filling method filled one day, refilled the next day and first coated the following day; thus the first filling was not dry when another filling was added, and the following coats were put on a filled surface which was not thoroughly dry. The firm that fills only once, but does it thoroughly and allows the filler time to dry beyond a doubt, saves the material and labor of refilling and saves a coat of lacquer.

Varnish Finish

If a varnish finish is desired, apply a coat of white shellac, this

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shellac to be cut according to the finisher foreman's own judgment, then well sanded and followed by two coats of a good grade of varnish. Always use the same varnish for both coats, as two different varnishes seldom work well together. Give proper drying time between these two varnish coats. If it is necessary to cut the varnish coats, be sure to use a good grade of turpentine.

Permit the varnish to become thoroughly dry before rubbing, and see that all oil and pumice stone are removed from the work. Oil left on the surface may cause the varnish to soften and result in printed work. Pumice stone left on the work will turn white and present a very bad appearance. The use of a good picking brush will prevent his.

Lacquer Finish

If a lacquer finish is used, the shellac coat can be put on if desired, or it may be eliminated and the work built up entirely with lacquer coats, dull rubbed or water rubbed as desired. Water rubbing will prove the quicker method with lacquer, and will give the semi-polish effect. If this rubbing gives more sheen to the surface than is desired, the work can be gone over lightly with an oil rag or waste, which will give a duller effect.

Portable Air Compressor Unit

A new air compressor outfit mounted complete on a 3-wheel steel truck for portability, is announced by Hobart Bros., of Troy, Ohio. Reference to the accompanying picture shows the equipment to include a ball bearing compressor-type motor driving a twin heavy-duty compressor, a 15-gal. tank with pressure gage and safety features, air filter, oil and moisture drains; also paint spraying and air cleaning equipment.

The rated capacity of the compressor is 8-cu. ft. per minute with 85-lbs. maximum pressure. Power for the motor is obtained by plugging in or connecting with the 25-ft. of extension cable attached. The outfit can be arranged to run continuously at a given pressure or it may be arranged to be controlled by an automatic start and stop switch governed by air pressure. The overall measurements of the complete outfit are 18x33x48-in.

Useful both for production and maintenance service—for cleaning and spraying.

The paint spraying equipment includes a spray gun, a cup container and 25-ft. of hose. The steel truck has one 6-in. and two 8-in. rubber tired iron wheels, with convenient handle for moving it easily from place to place.

There are some 50 different types of airbrushes now manufactured, doing everything from art work with very thin colors, lead and oil paints, up to putting stucco on buildings.

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Floor Finishing

Recently I noticed a question and answer about tacky floor varnish in one of the trade journals. The inquirer asked why varnish should remain tacky on a refinished floor which he cleaned with oxalic acid, which solution he allowed to remain on the surface for six hours, removing same with a cloth soaked in benzine. He then filled the floor with paste filler and after 21 hours' drying, he sandpapered, dusted and varnished it with a high grade spar varnish.

I would say the painter is at fault, and not the varnish, as he used an entirely wrong method to do the work.

To bleach the floor with oxalic acid is O. K. and it is immaterial how long one allows the oxalic acid to remain on the surface, but as oxalic acid is not soluble in benzine it cannot be removed with it. Some of the oxalic acid left on the surface was the cause of the tacky varnish.

The oxalic acid should have been thoroughly washed off several times with clean water, which should have contained a small amount of soda, or washing powder.

Oxalic acid being what its name implies, an acid, would have to be neutralized, or its nature changed; that is, the acid reaction should have been changed. This can only be done with an alkali. However, the alkali must not be too strong as it would darken the floor or affect the succeeding coats.

Vinegar will not neutralize oxalic acid, as the component part of it is acetic acid. One acid will not neutralize another. After making sure all the oxalic acid was removed, the floor should have been allowed to dry thoroughly. Before filling with paste filler, it would have been advisable to apply a thin coat of shellac, approximately 2-lbs. shellac to the gallon of alcohol. As the fibers of the wood were sponged up through the action of the oxalic acid and the water used in the cleaning, this coat of shellac is necessary.

The sanding should not have been done after cleaning and drying the floor, but after the coat of shellac, as shellac would have had a tendency to harden the surface, and the sandpaper would have cut off the small fibers of the wood, thus making a perfectly smooth job, whereas if sandpapering or filling is done before shellacing, a mottled appearance is left on the surface.

Filling the wood after shellacing and sanding, would also have resulted in a better job. Another thin coat of shellac over the filler is of advantage, but not necessary. However, slight sanding before varnishing would be of benefit.

A spar varnish is a so-called long oil varnish—soft and pliable in texture—therefore not the ideal material for a floor. A regular floor varnish should have been used. This is a short oil varnish, containing a larger quantity of gum, whereas a good many of the spar varnishes are more or less oil finishes containing very little or no gum.

However, the painter doesn't have to remove the entire mess again and refinish by using the method as above described. He may overcome the tackiness of the varnish by cleaning the surface with denatured alcohol, and

giving it a thin coat of shellac, following same with a coat of regular high grade floor varnish. It would be wrong to varnish over the shellac without giving the shellac at least 12 hours to thoroughly dry. Quite often painters think if shellac is dry to the touch of the hand it is perfectly dry. Shellac requires considerable time to dry completely, as the alcohol in it absorbs hydrogen from the air, turning into water, and this moisture must be allowed time to evaporate and the shellac to dry.—Geo. Whigelt.

New Lacquer Rubbing Liquid

The sudden rise in popularity of lacquer finishes has kept some finishers awake nights trying to find the best way to use this material and the easiest way to rub it. One of the first objections raised to the use of this finish, and one which resulted in it being abandoned by some shops, was that lacquer is difficult to rub by the methods which were successful on varnish. Those who fully appreciated the advantage of lacquer as a durable finish, however, were not inclined to discontinue its use merely because of certain difficulties encountered; they preferred to experiment, with a view to finding a solution of the problems presented.

Up to quite recently, rubbing has been done with pulverized pumice in combination with either water or oil. Some finishers have been using a fine water proof sandpaper.

The new method of rubbing does not involve any change in the cutting materials now in use, but only in the liquid used in connection with them. The new liquid is a mild soft-soap, in consistency like linseed or paraffin oil. Some finishers make this liquid by dissolving in water a sufficient quantity of neutral soap to make a liquid of the desired consistency. Others buy a liquid soap such as is used in public wash rooms.

When rubbing with this soap solution the cutting material, whether pumice or paper, must be very fine. The pressure must not be as heavy as when water or oil is used, and even with the lighter pressure the time required to do the work is less than when done with either clear water or oil.

Another advantage that the soap solution has over oil is that it eliminates the necessity of spiriting off, after the finished job has been standing several hours. Lacquer seems to have a tendency to absorb oil which returns to the surface after a few hours, and this must be spirited off before the stock is in proper condition for shipping. With the new method there is not only the saving of the additional operation, but the stock can be shipped without any delay.—Ralph P. Josylin.

This is the age of enamels, and the expert workman can produce some superb effects with them. While they may be purchased ready colored, some finishers prefer to color them in the shop, as occasion requires.

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APRIL, 1926

Seasonable Humidity

Comes now the time of year when finishing rooms will be up against the problem of humidity. There are in store many, many days when the atmosphere will have an unusually heavy moisture content. The effects of excessive moisture in the air and of direct drafts from the outside, are well known to experienced finishers. It is time to provide means or if suitable means are already provided, to see that they are in good working condition—for air control in the finishing department.

Various means are available by which the air in a work room can be artificially conditioned and controlled as to humidity, circulation and temperature. The problem is really one for the technical engineer and equipment manufacturer, if it is to be solved with the maximum degree of efficiency, but for the smaller concerns who feel they have not the money to spend on this service, other means less expensive and perhaps less efficient are possible. The point is that something should be provided even though it bears the earmarks of "home talent," and is only partially effective.

No finishing room that is on a production basis can afford to be without instruments by which the foreman finisher can determine the percentage of humidity of the room air, and no finisher foreman can afford to be without information regarding what is the limits of moisture content permissible in air where his finish operations are in progress.

Much spoiled work and trouble in general occurs every year in finishing rooms, due to lack of information, or inattention, or carelessness about air conditions within the departments.

Furniture in Colors

A remarkable change in evidence in many furniture finishing rooms today is the fact that they are beginning to use color extensively. Not only is color being used almost exclusively in breakfast room, sun room and porch furniture but its use is extending to bed room and living room furniture, novelty furniture and even to radio cabinets.

Evidently the 1926 style in furniture, like that in automobiles and dress, is going strong to attractive color combinations. Furniture, so long finished in natural and darkly stained finishes, is now coming out in the bright colors of fashion. Increased volume in sales are evidence of the popularity of the color finishes. Green, gray, blue, red, cream, orange, gold and black are among the colors used. Added beauty is obtained through striping, stenciling, ornamental hand painting and "smoking" or darker "shading", blended into the field color, as for example green or gold "smoked" with brown.

Some of this color work is obtained by color painting, covered later with a coat of varnish or lacquer to produce the finished luster, and some is done with color enamels or color lacquers applied over flat undercoats.

With this condition prevailing, and the practice of color finishing gaining momentum at an amazing rate in industry, where quantities in great volume are required, finish users, finish manufacturers and manufacturers of industrial finishing equipment, accessories and supplies are confronted with something new to think about.

Cars Must Be Refinished

Regardless of the type of finish used on a motor car, it cannot last forever. It is constantly exposed to certain destructive elements. The sun's light and heat, and many other natural agencies such as wind, rain, hail, snow, ice, fog, salt spray, dust and dirt are continually coming in contact with the film, trying to get at the surface underneath.

In addition there are many artificially produced influences, such as acid fumes, smoke, exhaust gases, oil, grease, road tar and battery acids, which combine their forces with that of the natural agencies to attack and destroy the finish. Eventually the original finish will succumb to this combined attack and it must be replaced by a refinish job, or these destructive forces will begin to exert their energies upon the automobile itself.

If a smooth coated finish is desired in the painting of any manufactured articles, is must be airbrushed.

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Pyroxylin Undercoats

Foreman Finisher of large woodworking establishment reveals interesting and important information, based on his own practical experience and the performance of materials he uses.

By Edward C. H. Rottmann

MANY foremen finishers, no doubt, have been more or less perplexed in deciding the proper undercoat to use in connection with pyroxylin enamel. In some lines of work it seems at present as if a special oil base undercoat gives best results, such as in the automotive and kindred lines. In industrial woodwork such as trim, fixtures and furniture, the pyroxylin pigmented surfacer is adaptable and acceptable; reputable producers guarantee that in this field, such surfacers will give as good or better service than oil undercoats.

The article I wrote on "Pyroxylin Enamel" in the December, 1925, issue of INDUSTRIAL FINISHING merited the attention of Mr. W. H. Martindale, who in the February issue of 1926 does not exactly agree with my views; yet, he has expressed some valuable and interesting criticism.

I appreciate from this little controversy the fact that the INDUSTRIAL FINISHING magazine, in printing these articles, shows us that the magazine is fulfilling a real necessity in that we can meet and discuss these problems on common ground, to the mutual benefit of all.

While Mr. Martindale contends that the oil base undercoat holds advantage over the pyroxylin undercoat for lacquer enamels, yet in the particular line of work I had reference to in my article, namely, the finishing of a general line of industrial woodwork and using such woods as poplar, gum, white pine, etc., I have never found the oil base undercoat to be superior to pyroxylin pigmented surfacers, if the latter are used properly. However, I will grant this:

Get Thin Priming Coat

Where the lacquer undercoat is sprayed too heavily the result will be as he stated, that proper adhesion does not take place. The most perfect adhesion, in my opinion, is obtained by spraying this material very thinly especially in the priming coat; any glazed surface on the bare wood should be roughened with sandpaper. This is essential in high-grade work.

Mr. Martindale's explanation of the liability of pyroxylin undercoats to chipping being due to a difference in the type of contact between oil and wood, as contrasted with pyroxylin and wood is novel, and interesting. My only remark in reply is that it does not concur with the facts of my own experience.

Many thousands of feet of millwork have passed under my close observation, and I speak from the viewpoint of one who has experimented and won, at the risk of being censured. I must say that I have seen pyroxylin undercoats, designed for use on metals, which have appeared far more elastic

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and equally as adhesive as any oil undercoat, so the wood field is not the only one being invaded by these new materials.

Judged by Performance

I hold no brief for pyroxylin undercoats, except as indicated by their performance. I must use oil undercoats and I must use pyroxylin undercoats, but as the days go by I find the latter practice becoming more and more judicious. Pyroxylin undercoats, applied as above mentioned, will sand as easily and quickly as shellac, and a four-coat job, say of two coats of pyroxylin undercoat and two coats of pyroxylin enamel, can be produced in 24 hours against 108 hours' time where an oil undercoat and an oil enamel are used. This is a conservative estimate of good material based on air-drying time.

The pyroxylin products of today are of a much higher standard than those of even a year ago and we have a right to expect much better results right along, as the industry has shown wonderful progress.

There is a possibility of obtaining poor results in the use of materials of low quality or grade, but all things being equal, there is no reason for the results being disappointing where pyroxylin undercoats of a standard quality are used. It is very apparent that the old methods are being ruled out by their slowness, when compared with the new ideas that are being adopted in modern shops.

Time may prove that these new methods sacrifice quality and durability in the interest of speed, yet, I believe the loss at present, if any, is so small as to be almost negligible when the gain in efficiency is given due consideration, and who can say at this early date that pyroxylin finishes are not as serviceable and as durable as oil undercoats and enamel?

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Using Varnish Remover

When using varnish remover use plenty of it, and give it time to work. Before applying the remover see that the liquid is thoroughly mixed, as the wax or whatever medium is used as a carrier, has a tendency to settle to the bottom of the container. If this carrier is not in solution the liquids in the remover will evaporate too quickly before they have time to do their work.

When applying the remover flow it on as heavy as possible, using a brush and brushing one way only, as brushing both ways or repeated brushings tend to break up the carrier, thus causing the solvents to evaporate. Any good varnish remover, when allowed to remain on the surface for 5 to 15 minutes, should eat through almost any finish, regardless how old it is.

After the varnish has been thoroughly softened, as can be readily seen by the broken or curled appearance, take a wide putty knife and lift off all the surplus remover and varnish. After your surface is well cleaned, go over it with a rag saturated with benzine. Then sand thoroughly with sandpaper and your surface should be ready for refinishing.—J. H. S.

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Cleaning Metal to be Finished

This article, prompted by a question in February issue, describes several chemical finish-removers and explains in detail approved methods of using them

By R. L. Masterson

TO PROTECT metal from rusting it is customary for manufacturers to coat it with a film of oil. And oil, grease or soap is also used on the metal during the stamping and shaping operations to aid the dies in forming the different shapes and forms. In addition the workmen leave innumerable hand and finger marks all over the metal.

Liquid Chemical Cleaners

There are now on the market many liquid chemical cleaners which fulfill very well the requirements of removing or counteracting all of these destructive agencies, with one application. These are known under many trade-marked or proprietary names and can be purchased through jobbers of automobile finishing materials or direct from the manufacturer.

Many of these cleaners contain alcohol to aid in dissolving the oil, an acid to clean the metal of rust, and a material to combine with the iron to form a surface film, which retards the formation of new rust after the metal is clean.

An analysis of four commercial cleaners of this type, which were obtained on the open market, shows the ingredients and percentages of each, as indicated in the accompanying table.

This table reveals the composition of four commercial cleaners.

These analysis do not necessarily represent the true composition of these cleaners, as it is quite likely that one or more of the original constituents had reacted with each other to form entirely new chemical compounds. They serve merely as an indication of some of the ingredients of these cleaners. In a practical test these four cleaners rated in the order mentioned for removing grease and rust and for preventing the reformation of rust; that is, No. 1 cleaner was the best and No. 4 cleaner was the poorest, although all of them gave fair results.

Method of Application

The usual procedure, in using any of these liquid chemical cleaners, is to apply the cleaner very generously to the surface with a fiber brush. While the cleaner is still wet on the surface of the

	Cleaner No. 1	Cleaner No. 2	Cleaner No. 3	Cleaner No. 4
Denatured Alcohol	60.5%	38.22%	18.87%	22.66%
Glucose		19.19%		
Glycerine	10.0%		8.65%	9.10%
Sulphuric Acid		11.28%	7.24%	8.92%
Phosphoric Acid	29.5%			
Tannic Acid				0.07%
Sodium Dichromate		1.85%		
Manganese Sulphate			3.96%	11.88%
Manganese Sulphate plus water of crystalization			61.28%	47.37%
Water		29.46%		

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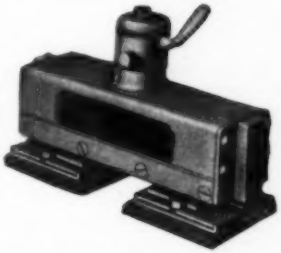

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metal, the metal should be scrubbed with steel wool to bring the cleaner into close contact with the metal and to aid in removing the rust. During both the application and scrubbing operations it is well to protect the hands from the acid and from splinters of steel wool by wearing rubber gloves.

Before the cleaner has dried, but after it has had a few minutes in which to do its work, the surface should be washed thoroughly first with cold water and then with hot water, to remove the cleaner. During this operation a sponge or a cloth should be used to rub the metal at the same time the water is applied, to aid in loosening and removing the cleaner.

The next operation is to dry the metal by rubbing thoroughly with clean dry rags. If a primer is applied before all of the moisture has evaporated the results will be disastrous.

If live steam is available it can be used to advantage for going over the metal before the drying operation, and in some cases it may be advantageous to use a blow torch to expel moisture from cracks, crevices or inside corners.

Dry Thoroughly Afterward

It is a safe precaution to wipe the metal thoroughly with a rag saturated with denatured alcohol, after the wiping method mentioned above. Alcohol will soften and remove any cleaner that may still be on the metal. When wiping off the metal take care to change the cloths frequently; otherwise they will become so saturated with the cleaner that instead of wiping off clean, they will be spreading a thin film of cleaner over the metal.

While these cleaners are very valuable for removing grease and rust, they will prove detrimental to the finished job if any of them are left on the metal. It is therefore necessary to spare no effort in making sure that the metal is perfectly clean and dry. To aid in insuring clean, dry work, it is advisable to place the metal in a heated chamber at a temperature of about 150 degrees F. for 30 or 60 minutes after the alcohol wash.

New Chemical Cleaner

There is now being developed a new type of chemical cleaner, which is built on a pigment base; it can be applied by spraying as well as by brushing. The cleaner itself is mild on the hands and no special precautions are necessary to protect them.

The spraying method, which is not possible with ordinary liquid cleaners, allows the work to be coated much faster. The color of the pigment makes it easy to immediately see any spots that may have been missed; this is not true with a clear liquid cleaner.

Using New Cleaner

The method of using the new cleaner is to spray or brush a coat onto the metal, the same as though a coat of primer were being applied. Let this stand about 15 minutes and then apply a mild heat of about 150 degrees F. for about 15 minutes. This completely dries the cleaner and it can then be brushed off with a cloth, with practically no effort,

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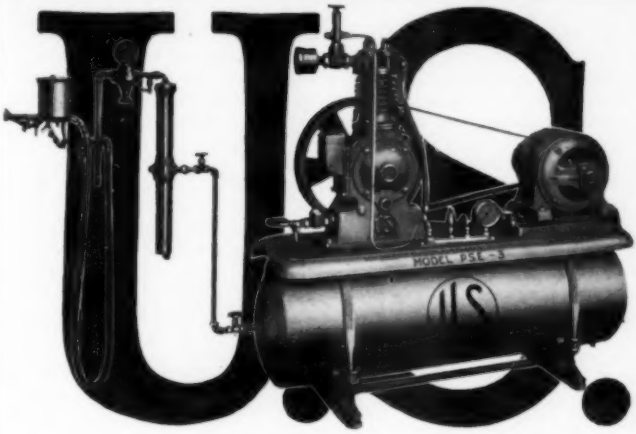

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taking the grease and the rust with it.

It is advisable to use a little steel wool or a wire brush during this removing operation, however, to insure the removal of the cleaner from cracks and crevices. The work should then be wiped with a rag wet with denatured alcohol, whereupon it is ready for the application of primer.

Since no water is used for removing the cleaner, the trouble experienced with moisture in cracks and crevices is eliminated. Exhaustive tests have shown that it is equal to any liquid cleaner in cleaning properties and that it does not promote re-rusting nearly so much as many liquid cleaners.

Caustic Solutions

Where rust is not present or can be removed by sandpaper or some other method, the grease is often removed from metal by dipping it into hot caustic solutions made either directly from caustic soda ash, or from one of the proprietory powder cleaning products on the market. Then the work is thoroughly rinsed with hot water to remove all traces of the alkali, following which it should be wiped perfectly dry with clean cloths.

Remove Traces of Caustic

It is sometimes advisable to apply mechanical friction of some sort, such as wiping over the work with a sponge or wet rag during the rinsing operation, to insure the caustic solution being thoroughly removed from the work. If any caustic remains on the work it is likely, after a period of time, to affect the finishing material that is applied over it.

Great care must be taken to remove the last traces of any chemical cleaner of this sort, before the finishing operation proceeds. The aim should be to get a chemically clean metal surface; then very little trouble will be encountered, either with the adherence of the finishing materials to the work, the formation of rust under the finish, or the durability of the finish.

There are several methods for cleaning unpainted metal to remove grease or rust without the use of acids, alkalis or chemical paint cleaners. A description of these methods will be found on page 48 of the December, 1925, issue of INDUSTRIAL FINISHING.

Decalcomania Decorations

The decalcomania method of ornamentation has progressed to the point where the finishing department can do beautiful work with these decorations which are now available in a large variety of designs, and at different prices according to size and colors. There are several different ways to put these on, anyone of which is good.

Glue, varnish, shellac, japan, gold size and a special cement, are some of the materials used for sticking on decalcomania transfers. Varnish, japan, gold size, or the cement are preferable. Shellac requires a lot of skill and quick handling, and glue is very mussy for this work.

Varnish, gold size or cement should be applied to the figured side of the transfer and let stand until the surface becomes tacky. Some transfers are duplex, having a heavy paper and a thin one.

Before applying the duplex transfer a corner of the heavy paper should be loosened by running a knife or something along the edge. Then press your transfer in place by smoothing and rubbing it with a cloth until all

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air bubbles are out. Rub it down smooth, then pull the heavy paper off and soak the thin paper with water; let it stand until you can pull this free without taking off the design. In cold weather luke warm water should be used.

An attractive and ornamental decalcomania design done in several tones of brown, yellow and green, with outlines in black.

With the single paper transfer you press the design on and be sure it is firm and tight; then soak and pull off the paper, after which wipe off the surplus varnish with a rag moistened with turpentine. Transfers can be cut and stuck together in various ways according to the skill of the one applying them.

If a transfer is applied before the cement is dry enough it is apt to wrinkle and pull off or crack. Transfers may be changed to different colors by touching the high lights in oil, which gives an effect that is hard to distinguish from a hand painted job.

Some question has come up in regard to the durability of transfers properly applied, they will stand long usage. I experimented some on this, choosing a large poppy design in colors of pink, orchid and purple which ordinarily would quickly fade. I placed this on the door panel of my car, using varnish as a cement, after which I went over it with two coats of wax. This stood outdoors, rain or shine, from May until November, 24 hours a day. When washed clean today, the design is as perfect as the day it was applied.

Of course, at present some designs of large sizes are expensive, but as the demand increases these will probably come down in price. This is a very rapid and quick way to do any decorating.—J. K. Cooper.

Editor's Note: The Meyercord Co. of Chicago, who at our request supplied the illustration for this article, advise that the "art relief" process, by which these decorations are made, is patented by them and that they are the only concern making transfers in relief. "The difference between 'relief' and 'flat,' in this case, is exactly the difference between oil painting and water colors in the effect produced," they say.

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Questions and Answers

This service department is conducted to meet the readers' need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer comments, suggestions or answers.

Gasoline Not Harmful To Lacquer Finish

Regarding A. B's. question in February issue, will state that, with the exception of the gums used in their manufacture, colored and clear lacquers do not contain materials which would be affected in the least by gasoline or similar solvents.

These gums, however, are sufficiently small in quantities and are so completely mixed and surrounded with the insoluble materials, such as nitro-cellulose, that the gasoline has no effect upon well constructed lacquers except when accompanied by considerable friction, as in sanding with sandpaper. Sanding with gasoline cuts the finish faster than when sanding with water or similar material.

This cutting action during the sanding operation is not detrimental to, nor does it have any effect upon, properly constructed lacquer. Many refinishing shops and manufacturing plants are using gasoline with sandpaper for removing the gun pit-marks from sprayed lacquer enamels.

In using gasoline for this purpose it is advisable to mix a small quantity of linseed oil with it; this will cut down the evaporation rate of the gasoline considerably, and at the same time it will help to protect the workman's hands and prevent the body oils being washed out of his skin by the gasoline.

While there is no objection to sanding only a small area at a time and immediately wiping up the surplus gasoline, this is not absolutely necessary for I have known of lacquer enamels to stand in close contact with gasoline for a period of 24 hours without being affected in the least.—W. H. Martindale.

Metal Casket Finishing

In reply to G. L. G. in March issue, many metal caskets are finished with solid covering colored enamels, either paint or lacquer, by brushing or spraying in much the same way that other metallic surfaces are finished.

Usually a priming coat is used next to the metal to give good adhesion and two or more coats of the proper shade of lacquer or paint enamel are applied over this primer, the number of coats depending considerably upon the color and quality of finish desired. For extra fine work the final coat is sometimes rubbed to a smooth surface with pumice stone and oil.

Striping and decorations are sometimes applied as the last operation, directly over the enamel coats and without any protecting coat over these decorations. At other times a coat of pale varnish or clear lacquer is applied over the decorations to seal and protect them. Lacquer enamels, japan colors and oil colors are used for these decorations.

Imitation wood grain and color are produced in the same general manner as on steel furniture,

cash registers, and similar objects. The essential method is to first apply a suitable shade of ground color or priming coat to give the desired color on the lighter parts of the work after being finished. For oak this ground color would be of a yellow ochre shade; for mahogany a red or orange shade, and for walnut a brown shade. This ground coat can be paint or lacquer, air dried or baked, as desired.

The next operation is to imitate the grain of the wood by applying a graining color of the proper shade according to the wood being imitated. While this coat is still wet it is grained with suitable brushes, rollers or other graining tools. Graining colors may be made of water colors or "distemper" colors, of japan colors or of oil colors, according to the amount of drying time available and the drying facilities at hand.

Following the graining color, decorations should be applied and then one or more coats of clear lacquer or varnish. The work can be rubbed or left glossy. See article on "Finishing Steel Mahogany" in February, 1926, issue of INDUSTRIAL FINISHING.

Imitation bronze finish is best produced by mixing suitable shades of bronze powder with a clear bronzing lacquer and applying one or more coats by spraying. A clear coat of lacquer should be applied over the bronze coats to protect them and to prevent the bronze from tarnishing. In producing the rough bronze effect a coat of stipple paste paint material or stipple lacquer should be applied before the bronze coats. See article on "Modern Stipple Finishes" in March, 1926, issue of INDUSTRIAL FINISHING.—I. F.

Fish Bait Can Finish

In answer to an inquiry signed "D. I." in March issue, I doubt if the fish bait cans could be finished any more economically than they are now being finished inasmuch as lacquer materials would cost more per gallon probably than the combination primer and finishing coat which is now being used. Furthermore, a larger quantity of material would be used in coating the cans by the spraying method, than by the dipping method, due to some of the finishing materials being evaporated and blown beyond the work.

In general, paint materials are cheaper than lacquer materials and likewise, dipping is usually more economical than spraying, from the labor standpoint as well as the quantity used. The only question to decide is whether the cost of baking the paint material is great enough to offset the extra cost of lacquer and the cost of applying it by spray.—I. F.

Finish For Mule Hide Floors

Replying to J. D.'s question under this title in March issue, I am not well acquainted with the "Mule Hide Roofing" which you mention but presume it is an asphaltum or tar-coated material similar to other tar papers or rubberized roofings which are commonly used.

If this is the case, it will be very difficult to finish this material with any paint, varnish or lacquer product, due to the fact that the tar or other waterproofing materials used in the manufacture of this roofing are soluble in naphtha and other solvents found in paint, varnish or lacquer.

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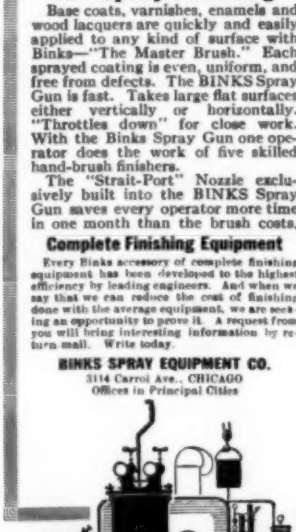

Of the three types of finishing material, undoubtedly better results could be obtained with a good grade of floor varnish than with either paint or lacquer, due to the fact that the solvents in the varnish will have less effect upon the material than lacquer, and due to the fact that the varnish does not contain any pigments which could be discolored (in the case of paints or enamel) by some of the tar or rubberized material being dissolved and bleeding through the finishing coat to give a streaked, unsightly appearance.

I suggest that you secure a small quantity of floor varnish, floor enamel and lacquer and make a few tests. You can quickly determine for yourself whether any or all of these materials will be satisfactory for coating this "Mule Hide Roofing."—W. H. T.

Preparing Aluminum Castings

Replying to A. C. Co. in March, issue, I believe that undoubtedly the best method of cleaning aluminum castings, so the finish will adhere most tenaciously, is by means of the sand blast. Aluminum naturally has a greasy feel to it and when very smooth does not give a good foothold for the first coat of finishing material, even when quite clean. The sandblast will leave the surface slightly etched and will aid the first coat in sticking.

If sandblasting is impractical, about all that can be done is to thoroughly wash the castings with naphtha or some other solvent for grease and dry them thoroughly with clean cloths.

In other instances it may be satisfactory to bake the castings for a short time at 400 or 500-

deg. F. just before finishing them, to burn off any oil or grease. It is not advisable to use caustic cleaning solutions with aluminum because it is easily attacked and dissolved by this chemical.—E. J. L.

Lowering Humidity in Varnish Room During Summer

The majority of finishers now understand that varnish dries more rapidly in a given temperature during the winter, than it does in the same temperature during the summer. Perhaps, however, all are not acquainted with the reasons why this is so. In many localities the humidity is very low during the winter and extremely high during the summer.

Varnish requires a reasonable humidity. If the humidity is much below a certain point, the varnish will caseharden in much the same way that wood does; it takes on a hard outer film before the inside is dry, and this outer film retards the drying process.

During summer months the humidity is as much too high for proper drying as it is too low in the winter. Although the room temperature may be higher in the summer than during the winter, the drying proceeds more slowly.

The market affords various types of humidity controls which will enable one to maintain any desired humidity, but it is not these that I wish to discuss. What I wish to speak of now, is how to reduce the humidity during warm weather, by employing such facilities as are already in the shop.

A considerable number of varnish rooms have steam heating pipes running along the wall. My plan is to disconnect these

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from the steam supply line, and connect them with the water system. Run cold water through them! This will cause what some people call "sweating" of the pipes, which is nothing more than the condensing of the moisture in the air as it comes in contact with the pipes.

Of course, all that this does, is to lower the humidity. It does not control humidity at any particular point, but there is no danger of causing too great a loss of moisture from the air during the summer period of high-humidity. It will also tend to a lowering of the temperature of the varnish room which, combined with a lowering of the humidity, makes the room much more comfortable for the workmen. Due to the fact that it lowers the temperature, it is possible to use this method only in very warm weather, but, as a rule, that is the only time it is needed.

In very warm weather the condensation will be such that a great deal of water will collect on the pipes. This can be taken care of by placing a galvanized iron trough beneath the pipes to carry the water away.

In localities where water is not any too plentiful one may hesitate to use the method of lowering the humidity here suggested, unless some method of using the water can be employed after it has circulated through the pipes. In factories using steam power, the water can be returned for use in the boilers after it has accomplished its purpose in the varnish room. The increase in its temperature will render it more fit for use in boilers than if it had been drawn directly from a well or hydrant.

The use of the steam-heating system for such dehydrating purposes as is here suggested, precludes its use for heating the varnish room in the event of a cool day when heat would be necessary. But every varnish room should be provided with an auxiliary heating system to be used when the temperature is not low enough to require the use of the general heating system.

This may consist of a separate coil of pipes connected directly with the boilers, to be supplied with live steam when heat is necessary. Factories using steam power are usually heated with exhaust steam during the winter, and the pipes in the varnish room are connected with the main system. The idea is to disconnect these as soon as warm weather sets in, and restore the connection in the fall when general heating is again required.—R. H. P.

Shellac With Glycerine

Users of shellac have always had difficulty in spreading a uniform coat, free from brush marks, on large surfaces. Some of the more rapid of the experienced brush hands have been able to apply a medium-weight shellac with fair results, but others found it possible to make a passable job only by making the shellac quite thin.

Finishers who cut their own shellac, as many are doing, instead of buying it cut ready for use, will find it improves the brushing qualities if one teaspoonful of glycerine is added to each gallon of alcohol and stirred through before the alcohol is used as a solvent.

If shellac is bought in liquid form ready for use, a teaspoonful of glycerine for each gallon of

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shellac may be added to a small quantity of alcohol, and then added to the shellac. This will retard the setting qualities of the shellac sufficiently to enable the operator to apply it more evenly and with fewer brush marks. At the same time the effect of the glycerine on the ultimate drying, to the point where it can be sanded and coated over, is practically nil.

Much interior finishing is now done in shellac. Two or three coats of shellac are applied and then rubbed with oil and pumice. Usually this produces a very dead finish, or at least one that is quite dull; glycerine will help to produce a better finish.

After the rubbing has been done a beautiful luster can be produced by going over the shellac briskly with a clean, dry cloth. Another advantage is that the luster can be maintained by occasionally rubbing the shellac as in the first instance. Of course, this does not produce that deep, brilliant polish that was so common a few years ago, but it does take away that sombre deadness usually associated with shellac finishes. Precaution must be taken, however, to guard against the tendency of overdoing a good thing. Some people have an idea that if a little of something is good, more will be better.

Where the element of time in drying is not very important, the amount of glycerine used may be increased to two spoonsful to a gallon of shellac. Of course, I have in mind pure shellac. There are imitations of shellac, and adulterated shellac; I cannot say what effect glycerine would have when used with these.

There are various kinds of solvents used for cutting shellac; and I cannot say what effect glycer-

ine would have when used with these. One can learn these things only by experimenting. I do not claim to know all the imitations and adulterations of shellac, nor all the solvents. I do know pure shellac and alcohol as its solvent, however, and it is of these that I speak.

If one wishes to know how glycerine will work with some particular substitute he can find out by doing a little experimenting, but it should be done on a small scale to avoid wastage. Such experimenting should be done on scrap boards, etc., not on the regular line of work.—K. D. L.

Crackle Finish

What was once looked upon as a misfortune in the finished article—a hopelessly ruined job—is now a very popular form of finish. It is "crackle," produced by nothing more nor less than the drying of the last coat of varnish or lacquer upon a quicker drying undercoat. Simply color either of the two liquids as you wish, and apply.

If you apply a coat of shellac upon a coat of the same liquid material, there will be no crackling. Both coats will dry in equal time. But with the outer coat made softer, say a lacquer containing some linseed oil, and the undercoat hard, the last coating is bound to dry slowly but at last it will pull itself into the form of patches separated by very irregular cracks.

Such an idea for a finish! And yet there is no denying its beauty, and as for its popularity, that is everything after all.

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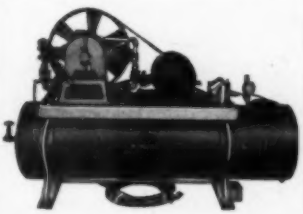

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and this is very fine. Fine cracks are produced by thin outer coating; on the converse, broad cracks are the result of a heavy outer coating.—J. I. C.

Testing Solvents

In my visits to the different factories I find many finishing foremen using the different solvents in the wrong places, and then wondering why they are not getting satisfactory results. For the benefit of foremen finishers I will endeavor to describe a test that I often put solvents to, to determine the drying time of each.

For the test, take two pieces of ordinary white office paper and hang them free from the wall, marking one, "solvent we use," and the other, "solvent offered."

Measure out equal parts of both solvents. Take one in each hand and splash the solvents against the two pieces of paper, taking care to note that you have marked the papers to correspond. Note the time and watch the papers; then note the time when the first one is completely dry and also take the time when the second paper is completely dry.

Result: Difference in time faster or slower between the solvent you are using and the one offered. The foreman then can easily determine, from the nature of his work, which solvent is better to use in his particular case. This test may be used to secure a comparison of drying time between any two solvents. —G. M.

Some japan colors give considerable trouble when sprayed, due to clouding. Too high air pressure is usually the cause.